Request for Expression of Interest

In-Home Feedback Devices (RFEI #1089)

ISSUE DATE

December 2, 2011

CLOSE DATE/TIME

Dec 21, 2011

11:00:00 AM

Pacific Standard Time (PST)

Contact Person

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This document is comprised of BC Hydro proprietary information and is intended for the supplier's internal use only in preparing a response to RFEI #1089

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SECTION 1 - INTRODUCTION

Company Information

BC Hydro is one of North America's leading providers of clean, renewable energy, and the largest electric utility in British Columbia, serving approximately 95 per cent of the province's current population and approximately 1.8 million customers (expected to grow to 1.93 million by 2013). BC Hydro's vision is "powering B.C. with clean, reliable electricity for Generations."

As a provincial Crown Corporation established in 1962 under the British Columbia Hydro and Power Authority Act, BC Hydro reports to the Minister of Energy, Mines and Petroleum Resources, and is regulated by the British Columbia Utilities Commission (BCUC).

BC Hydro's various facilities generate between 43,000 and 54,000 gigawatt hours (GWh) of electricity annually, depending on prevailing water levels.

Electricity is delivered through a network of 18,336 kilometres of transmission lines and 55,705 kilometres of distribution lines. The transmission and telecom assets are owned and operated by BC Hydro.

BC Hydro is in the process of deploying advanced metering infrastructure, including smart meters. This document relates directly to that program. More information about that program is available here:

http://www.bchydro.com/energy_in_bc/projects/smart_metering_infrastructure_program.html

Additional information about BC Hydro is available at: www.bchydro.com

Executive Summary

This RFEI is designed to inform in-home energy feedback device (IHD) vendors of device requirements for operational compatibility with BC Hydro smart meters, as well as eligibility for potential future BC Hydro marketing programs. These preliminary requirements are outlined in the product requirements document (PRD) – please see section 6 of this document.

This PRD is not intended to be prescriptive and inflexible. Rather, BC Hydro hopes to open a dialogue with vendors and retailers to assure that the specifications and suggestions contained therein reflect industry best practices, leverage the ability of these devices to affect conservation behavior, and best seed a nascent industry.

Specifically, BC Hydro will host a series of workshops to engage manufacturers in finalizing these requirements and to discuss the overall home-area network (HAN) strategy, including testing and qualification. We encourage active participation as part of a community striving to create a vibrant energy insight industry. A final revised version of the PRD will be released following these workshops and industry consultations.

SECTION 2 - THE PROJECT

BC Hydro is mandated by the provincial government to provide customers with the ability to provision a home area network off of their smart meters by December 31, 2012, and ultimately launch an in-home device program under the Power Smart banner to encourage residential customers to conserve energy by providing them with detailed and timely information about how and when they use electricity in their home.

Potential solutions may include:

- Stand alone display devices (IHDs), or
- Gateway solutions, which are bundled software and hardware devices designed to connect a customer's smart meter to home networks and PCs. Gateway devices themselves may be Wi-Fi devices, wired (Ethernet) devices, or USB dongles.

The product requirements document (please see section 6 of this document) outlines a minimum set of requirements identified as necessary to be compatible with BC Hydro's current systems and future marketing efforts.

SECTION 3 - REQUEST FOR EXPRESSIONS OF INTEREST

As this document is a request for expressions of interest, suppliers are encouraged to provide as much information as possible; however BC Hydro understands that not every question will be applicable to each respondent.

Section No.	Title	Contents
1.	**Introduction**	
1.1	**Company Name** Provide the legal name of the Respondent.	
1.2	**Contact Information** Provide the name and contact details for the Respondent's Representative. Respondent's Representative: Name Mailing/courier addresses Telephone number Mobile number (optional) Email address Website address	
2	**Overall Solution**	
2.1	**Please describe your company's products and/or services**	
3	**PRD Comments**	
3.1	**Comments on the PRD laid out in Section 6**	
3.2	**Please provide any other notes or comments here**	

SECTION 4 - RESPONSE PROCESS

Submission Guidelines:

Timelines:

Any potential supplier who has interest in the PRD program should complete Section 3 and return it as described below by December 21 at 11:00:00 PST.

Format:

Submission should consist of one bound hardcopy not exceeding ten (10) pages double sided in length, and one (1) soft copy on a USB drive in Portable Data Format (PDF).

Delivery Location:

BC Hydro Bid Station

535 Hamilton Street

Vancouver, B.C. V6B 2R1

RE: RFEI 1089

SECTION 5 - FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT BC "FOIPPA"

All documents and other records in the custody of, or under the control of, BC Hydro are subject to the Freedom of Information and Protection of Privacy Act (FOIPPA) and other applicable legislation. Except as expressly stated, and subject to FOIPPA or other applicable legislation, all documents and other records submitted in response to this RFI 1017 will be considered confidential.

SECTION 6: PRODUCT REQUIREMENTS DOCUMENT (PRD)

1.1 TECHNOLOGY

BC Hydro will enable a HAN in residential smart meters based on ZigBee Smart Energy Profile version 1.1 (SEP 1.1) technology.

1.2 DEFINITIONS

Compatible Devices means any device that is:

- certified by the ZigBee Alliance as an in-premises device1 using SEP 1.1, and
- approved by the meter vendor (Iron) to work with the BC Hydro meter that

will be able to securely connect to the HAN and receive near real-time information from the meter. This document refers to such devices as “Compatible” devices.

Eligible Devices describes how BC Hydro intends to partner with retailers to sell HAN devices in their stores, and connect these devices at the store. In addition, BC Hydro anticipates the ability to offer a rebate to customers towards this purchase. Devices sold in this manner are referred to as “**Eligible**” devices, as they are eligible for inclusion in the planned rebate program.

1.3 DEVICE REGISTRATION

Activation (pairing) of these devices will take place:

1. On the BC Hydro website
2. Over the phone with BC Hydro Customer Representatives, and possibly
3. At the retailer through a BC-Hydro provided and connected application

A document describing this process will be provided under separate cover.

1.4 COMPATIBLE DEVICES

Compatible devices must satisfy the following requirements, and be fully tested according to BC Hydro testing policy, which will follow under separate cover.

[1] In-Premises Device is defined in the ZigBee Smart Energy Profile specification.

1.5 FUNCTIONAL REQUIREMENTS

REQ 1. ZigBee Smart Energy 1.1 Certification

The HAN device must support all mandatory SEP 1.1 functionality, as certified by the ZigBee Alliance and deemed necessary to operation on a SEP 1.1 HAN. Main operational features include tiered pricing (known in BC as Residential Incline Block rates), and fast polling. Other details outlining exactly which clusters and functions are to be included are to follow under separate cover.

REQ 2. Compliance with the BC Safety Standards Act

If applicable (e.g. mains powered), the device must bear an appropriate certification mark as evidence of meeting BC safety standards. Refer to the British Columbia Safety Authority for details on the certification or approval marks and labels that are acceptable in BC.

REQ 3. Industry Canada Certification of Radio Equipment

The device must satisfy Industry Canada requirements for compliance with radio standards specifications and bear the appropriate labelling.

REQ 4. Provincial and Federal Legislation

The device must comply with any other BC or Canadian legislation, as appropriate.

1.5.1 PERFORMANCE REQUIREMENTS

REQ 5. Device Pairing with BC Hydro Meters

The device must successfully pair with the HAN module in BC Hydro meters using BC Hydro device pairing systems and methods.

When the device is de-paired from the meter, the relationship is released from the device side (via the release command).

1.6 ELIGIBLE DEVICES

Eligible devices must satisfy the requirements stated above for compatible devices, as well as the specific requirements outlined below.

1.6.1 FUNCTIONAL REQUIREMENTS

REQ 6. ZigBee Smart Energy 1.1 Requirements

The HAN device must support all mandatory SE 1.1 functionality (as outlined above under sec 2.5.1) as well as the following functionality.

a) Device must be certified as a ZigBee SEP In-Premises Display device

b) Device must support the ZigBee SEP 1.1 clusters, attributes, and commands listed in Appendix B.

REQ 7. Price Display

The device must determine the current active price (note that BC Hydro has tiered pricing called RIB or Residential Incline Block rates) and display this in $/kWh, rounded to 3 or more decimal places for cents. Note that this includes tracking billing date and storing thresholds. Price, or a visual indicator of price (see REQ 12), must be shown on the default, or primary, screen of the display.

REQ 8. Manual Price Entry Not Allowed

The device must not allow price of energy to be manually entered into the device.

REQ 9. Power and Cost of Power

The device must display power in kW and $/hr (with at least 2 decimal places for cents) for the current moment in time.

REQ 10. Energy and Cost of Energy

The device must display cumulative energy consumed in kWh and $ (to at least 2 decimal places for cents) for at least the following time periods:

- Current Day (since midnight) or ‘past 24 hours’
- Current Bill Period (stated clearly that this is an estimate).

REQ 11. Block Period Dates

When inclining block rates are in effect, the user must be able to view the start and stop dates for the current block period (i.e. the billing dates).

REQ 12. Meter Register

The device must display the current meter register reading for the cumulative energy in kWh.

REQ 13. Text Messages

The device must receive and display text messages of as long as 80 ASCII characters that are sent via the HAN gateway in the meter. The device must send a signal when the message is

REQ 14. Text Message Waiting Indicator

The device must display an indication that a new message has been received. For example, this may be an envelope icon or a special LED light display.

REQ 15. Pairing Process Result and Signal Strength Indicator

The device must display its pairing status. This may be led, text, or an icon on the display. In addition, the device must display wireless signal strength at all times, and indicate when there has been a loss of connectivity to the HAN. For example, this may be in the form of text on the display stating no signal, or zero bars in a signal strength icon.

REQ 16. Battery Level Indicator

If battery operated, the device must display the level of battery charge remaining. For example, this may be text on the display stating 'battery full/med/low', or by bars in a battery icon.

REQ 17. Time of Day

The device must display the correct time of day (HH:MM) using the correct time zone. The time should be set automatically and synchronized with BC Hydro (i.e. not user-settable).

REQ 18. Device Labelling

The device must have a label specifying it has been certified with ZigBee SEP 1.1 and must include the MAC address and installation code in both human-readable and bar code formats (details to be determined during the development process). Also, it must have vendor contact information for product support purposes (i.e. phone number).

REQ 19. Product Documentation

The device must be packaged to include installation instructions, a user manual, support information, and company contact information (phone and web). This documentation must be easy to understand for a non-technical user. In addition, the documentation must include a statement that the costs indicated on the device may not match the bill from BC Hydro and that BC Hydro's bill is the authoritative source for billing information. BC Hydro will provide such information under separate cover.

REQ 20. Firmware Upgrades

The device must have the ability to be upgraded by the consumer.

REQ 21. Reset Capability

The device must have the ability to be reset to factory default settings by the user. This reset must include erasing all text message, energy, cost, and price information on the device and must also de-pair and re-pair the device from the HAN (requiring the device to go through the pairing process to reconnect to the HAN).

REQ 22. Operational Information

a) The device must display operational information including MAC address, installation code, RF Channel, PAN ID, Short Address. In addition, firmware version and model number must be displayed or clearly identified on the product itself. Optionally, this could also display EPAN and Key.

b) The device must identify itself by providing the following information to the meter:

   i. Hardware version

   ii. Firmware version

   iii. Serial number

c) The device must provide on-screen diagnostics with (at minimum) latest error code and time of error.

1.6.2 PERFORMANCE REQUIREMENTS

REQ 23. Device Pairing – Performance

After using BC Hydro systems (online registration or CSR), customers must be able to pair their device to their meter in no more than 2 additional steps. For example, after providing the device MAC address and Installation Code to BC Hydro systems and after this information is sent to the meter by BC Hydro, the 2 additional steps may be as follows: step 1 would be the customer powering on the device, and step 2 (if needed) would be the customer pressing a button on the HAN device to initiate pairing.

REQ 24. Near Real-Time Display of Information

When viewing cumulative consumption information, the device shall update every 30 seconds.

REQ 25. Fast-Polling Display of Information

The device shall utilize a ‘fast polling’ mode that persists for 15 minutes when the device is put into consumption display mode. While in this mode, the device shall display updated power (energy per hour in kW and $) information every 2 seconds.

REQ 26. Reconnect After Power Loss

The device must reconnect to the home area network without requiring human intervention after the device has lost power (e.g. battery replacement, unplugged from power outlet), the meter has lost power, or any other event causes the device to drop from the network (such as interference). All device settings history data, text messages, etc. must persist through a power loss or any other loss of network connectivity.

REQ 27. Operational Distance

The device must operate at a distance of two hundred feet (200') from the meter in unobstructed space.

1.6.3 BUSINESS REQUIREMENTS

The device vendor must provide a written agreement that they will implement and maintain the following business requirements.

REQ 28. Environmental Considerations

The device vendor must take into account environmental responsibility for hardware, software, installation of components, packaging, energy consumption, and disposal of components. The device should support the following:

A. Average power consumption less than 1W (for gateway devices see requirement #34)
B. Environmentally friendly production (from raw materials to manufacturing processes and retail packaging)
C. Environmentally friendly disposal, with the preferred method of disposal explained in the documentation.

REQ 29. Safety

Any safety hazards related to the device must be documented with the device packaging. For example, documenting a choking hazard exists if batteries are included.

REQ 30. Packaging and Labelling

The packaging must be labelled, in a legible font, with the following information:

A. Installation code in hexadecimal format and bar code format
B. Caveat that the cost displayed may not equal the bill and does not replace the bill
C. Disposal instructions
D. Manufacturer support contact information, including a phone number and website address

E. All necessary regulatory labeling and BC Hydro terms and conditions sheet.

REQ 31. Product Warranty

The device vendor must provide a minimum of one (1) year of warranty for the device.

REQ 32. Product Support

The device vendor must commit to provide support for their products for a minimum of five (5) years from the date of the first sale of their device in BC. Support must include:

A. Toll-free phone support

B. f-serve support available 24 hours a day, that should include:

   i. Online access to all documentation included with the device

   ii. Troubleshooting steps

   iii. Answers to frequently asked questions (FAQs)

1.6.4 ADDITIONAL REQUIREMENTS FOR GATEWAY SOLUTIONS

In addition to the above requirements for eligible devices, additional requirements exist for gateway solutions. Gateway solutions are described in section 1 as:

“Gateway solutions. These solutions will be bundled software and hardware devices to connect the smart meter to home networks and PCs. The gateway devices themselves may be Wi-Fi devices, wired (Ethernet) devices, or USB dongles. “

Essentially gateway solutions are thus defined as hardware/software packages that enable users to view real-time energy feedback on connected smart devices either directly or through a home area network. The software may be provided separately or embedded in the device itself (for example if a web server is being run and connected devices ‘hit’ the gateway with a browser).

Actual embedded devices (such as ZigBee radios embedded in other consumer devices such as routers or set-top TV boxes) would not qualify for a rebate under this program.

REQ 33. Requirements for Wi-Fi devices

Maximum power consumption: 2W (average over a 24 hour period)

Must incorporate Wi-Fi sleep mode.

Must be Wi-Fi certified.

REQ 34. Power consumption for other gateway devices

If the hardware component of the gateway solution is a removable device such as a USB dongle, wired Ethernet device, or network card, only incremental power consumption is considered and must be less than 1W as specified in REQ 31.

REQ 35. Status Indicators

Must indicate status of the connection to the meter (pairing status) and to the network. Where applicable (such as in Wi-Fi access point mode), must indicated that the network is enabled and traffic is active.

REQ 36. Security

At minimum, 128-bit encryption must be present on the computer/LAN side of the gateway. A more detailed specification of security will follow.

REQ 37. Upgrade

Must be user-upgradeable. When SEP 2.0 is certified, must be upgradeable to that standard.

REQ 38. Registration and Pairing

See REQ 24. In addition, gateway devices must complete Zigbee Han registration to the meter upon the user connecting to the gateway through the client device (merely turning the device on is not sufficient).

REQ 39. Compatibility

In order for devices to be eligible for a rebate, they must be test-able in the BC Hydro lab, as per our eligibility program. BC Hydro supports most common platforms (Android, Mac, PC). A more detailed list of platforms and operating systems will be provided under separate cover.